CLAIMS

1. A display device comprising:

a thin film transistor including:

a gate electrode comprising a conductive material over one of substrates;

an island shape gate insulating film including at least one of a silicon nitride layer, a silicon oxynitride layer, and a silicon oxide layer, which is in contact with the gate electrode;

a semiconductor layer; and

source and drain wirings comprising a conductive material, which is connected to the semiconductor layer; and

a pixel electrode connected to the thin film transistor,

wherein an end of the semiconductor layer is provided so as not to protrude from an end of the gate insulating layer.

2. A device according to claim 1, further comprising an adhesion improving layer comprising one of a metal material and a metal oxide material for pretreatment before forming at least one of layers to be formed.

3. A device according to claim 1, further comprising a protective film over the semiconductor layer.

4. A device according to claim 1, wherein the conductive material of at least one of the gate electrode and the source and drain wirings contains one selected from the group consisting of Ag, Au, Cu, W, and Al as a main component.

5. A device according to claim 1, wherein the thin film transistor can be operated at an electric field effect mobility of 1 $cm^2/V \cdot sec$ to 15 $cm^2/V \cdot sec$, and the semiconductor layer of the thin film transistor contains hydrogen and halogen, and a semiconductor having a crystal structure.

6. A device according to claim 1, wherein the display device is a liquid crystal display device and the substrates sandwich liquid crystal.

7. A device according to claim 1, wherein the display device is mounted in one of a television receiver, a personal computer, a cellular phone, an information display, and an advertising board.

8. A display device comprising:

a thin film transistor including:

a gate electrode comprising a conductive material over one of substrates;

an island shape gate insulating film including at least one of a silicon nitride layer, a silicon oxynitride layer, and a silicon oxide layer, which is in contact with the gate electrode;

a semiconductor layer; and

source and drain wirings comprising a conductive material, which is connected to the semiconductor layer; and

a pixel electrode connected to the thin film transistor,

wherein an end of the semiconductor layer is provided so as to coincide with an end of the gate insulating layer.

9. A device according to claim 8, further comprising an adhesion improving layer comprising one of a metal material and a metal oxide material for pretreatment before forming at least one of layers to be formed.

10. A device according to claim 8, further comprising a protective film over the semiconductor layer.

11. A device according to claim 8, wherein the conductive material of at least

one of the gate electrode and the source and drain wirings contains one selected from the group consisting of Ag, Au, Cu, W, and Al as a main component.

12. A device according to claim 8, wherein the thin film transistor can be operated at an electric field effect mobility of 1 $cm^2/V \cdot sec$ to 15 $cm^2/V \cdot sec$, and the semiconductor layer of the thin film transistor contains hydrogen and halogen, and a semiconductor having a crystal structure.

13. A device according to claim 8, wherein the display device is a liquid crystal display device and the substrates sandwich liquid crystal.

14. A device according to claim 8, wherein the display device is mounted in one of a television receiver, a personal computer, a cellular phone, an information display, and an advertising board.

15. A display device comprising:

a thin film transistor including:

a gate electrode comprising a conductive material over one of substrates;

an island shape gate insulating film including at least one of a silicon nitride layer, a silicon oxynitride layer, and a silicon oxide layer, which is in contact with the gate electrode;

a semiconductor layer;

source and drain wirings comprising a conductive material, which is connected to the semiconductor layer; and

one of a silicon nitride layer and a silicon oxynitride layer which is in contact with the source and drain wirings; and

a pixel electrode connected to the thin film transistor,

wherein an end of the semiconductor layer is provided so as not to protrude from an end of the gate insulating layer.

16. A device according to claim 15, further comprising an adhesion improving layer comprising one of a metal material and a metal oxide material for pretreatment before forming at least one of layers to be formed.

17. A device according to claim 15, further comprising a protective film over the semiconductor layer.

18. A device according to claim 15, wherein the conductive material of at least one of the gate electrode and the source and drain wirings contains one selected from the group consisting of Ag, Au, Cu, W, and Al as a main component.

19. A device according to claim 15, wherein the thin film transistor can be operated at an electric field effect mobility of 1 $cm^2/V \cdot sec$ to 15 $cm^2/V \cdot sec$, and the semiconductor layer of the thin film transistor contains hydrogen and halogen, and a semiconductor having a crystal structure.

20. A device according to claim 15, wherein the display device is a liquid crystal display device and the substrates sandwich liquid crystal.

21. A device according to claim 15, wherein the display device is mounted in one of a television receiver, a personal computer, a cellular phone, an information display, and an advertising board.

22. A display device comprising:

a thin film transistor including:

a gate electrode comprising a conductive material over one of substrates;

an island shape gate insulating film including at least one of a silicon nitride layer, a silicon oxynitride layer, and a silicon oxide layer, which is in contact with

the gate electrode;

a semiconductor layer;

source and drain wirings comprising a conductive material, which is connected to the semiconductor layer; and

one of a silicon nitride layer and a silicon oxynitride layer which is in contact with the source and drain wirings; and

a pixel electrode connected to the thin film transistor,

wherein an end of the semiconductor layer is provided so as to coincide with an end of the gate insulating layer.

23. A device according to claim 22, further comprising an adhesion improving layer comprising one of a metal material and a metal oxide material for pretreatment before forming at least one of layers to be formed.

24. A device according to claim 22, further comprising a protective film over the semiconductor layer.

25. A device according to claim 22, wherein the conductive material of at least one of the gate electrode and the source and drain wirings contains one selected from the group consisting of Ag, Au, Cu, W, and Al as a main component.

26. A device according to claim 22, wherein the thin film transistor can be operated at an electric field effect mobility of 1 $cm^2/V \cdot sec$ to 15 $cm^2/V \cdot sec$, and the semiconductor layer of the thin film transistor contains hydrogen and halogen, and a semiconductor having a crystal structure.

27. A device according to claim 22, wherein the display device is a liquid crystal display device and the substrates sandwich liquid crystal.

28. A device according to claim 22, wherein the display device is mounted in

one of a television receiver, a personal computer, a cellular phone, an information display, and an advertising board.

29. A display device comprising:

a first thin film transistor including:

a gate electrode comprising a conductive material over one of substrates;

an island shape gate insulating film including at least one of a silicon nitride layer, a silicon oxynitride layer, and a silicon oxide layer, which is in contact with the gate electrode;

a semiconductor layer; and

source and drain wirings comprising a conductive material, which is connected to the semiconductor layer; and

a pixel electrode connected to the first thin film transistor,

a driving circuit having a second thin film transistor having a same structure as the first thin film transistor; and

a wiring layer which is extended from the driver circuit and connected to the gate electrode of the first thin film transistor,

wherein an end of the semiconductor layer is provided so as not to protrude from an end of the gate insulating layer.

30. A device according to claim 29, further comprising an adhesion improving layer comprising one of a metal material and a metal oxide material for pretreatment before forming at least one of layers to be formed.

31. A device according to claim 29, further comprising a protective film over the semiconductor layer.

32. A device according to claim 29, wherein the conductive material of at least one of the gate electrode and the source and drain wirings contains one selected from the

group consisting of Ag, Au, Cu, W, and Al as a main component.

33. A device according to claim 29, wherein the first and second thin film transistors can be operated at an electric field effect mobility of 1 $cm^2/V \cdot sec$ to 15 $cm^2/V \cdot sec$, and the semiconductor layer of each of the first and second thin film transistors contains hydrogen and halogen, and a semiconductor having a crystal structure.

34. A device according to claim 29, wherein the display device is a liquid crystal display device and the substrates sandwich liquid crystal.

35. A device according to claim 29, wherein the display device is mounted in one of a television receiver, a personal computer, a cellular phone, an information display, and an advertising board.

36. A display device comprising:

a first thin film transistor including:

a gate electrode comprising a conductive material over one of substrates;

an island shape gate insulating film including at least one of a silicon nitride layer, a silicon oxynitride layer, and a silicon oxide layer, which is in contact with the gate electrode;

a semiconductor layer; and

source and drain wirings comprising a conductive material, which is connected to the semiconductor layer; and

a pixel electrode connected to the first thin film transistor,

a driving circuit having a second thin film transistor having a same structure as the first thin film transistor; and

a wiring layer which is extended from the driver circuit and connected to the gate electrode of the first thin film transistor,

wherein an end of the semiconductor layer is provided so as to coincide with an end of the gate insulating layer.

37. A device according to claim 36, further comprising an adhesion improving layer comprising one of a metal material and a metal oxide material for pretreatment before forming at least one of layers to be formed.

38. A device according to claim 36, further comprising a protective film over the semiconductor layer.

39. A device according to claim 36, wherein the conductive material of at least one of the gate electrode and the source and drain wirings contains one selected from the group consisting of Ag, Au, Cu, W, and Al as a main component.

40. A device according to claim 36, wherein the first and second thin film transistors can be operated at an electric field effect mobility of 1 $cm^2/V \cdot sec$ to 15 $cm^2/V \cdot sec$, and the semiconductor layer of each of the first and second thin film transistors contains hydrogen and halogen, and a semiconductor having a crystal structure.

41. A device according to claim 36, wherein the display device is a liquid crystal display device and the substrates sandwich liquid crystal.

42. A device according to claim 36, wherein the display device is mounted in one of a television receiver, a personal computer, a cellular phone, an information display, and an advertising board.

43. A display device comprising:

a first thin film transistor including:

a gate electrode comprising a conductive material over one of

substrates;

an island shape gate insulating film including at least one of a silicon nitride layer, a silicon oxynitride layer, and a silicon oxide layer, which is in contact with the gate electrode;

a semiconductor layer;

source and drain wirings comprising a conductive material, which is connected to the semiconductor layer; and

one of a silicon nitride layer and a silicon oxynitride layer which is in contact with the source and drain wirings;

a pixel electrode connected to the first thin film transistor,

a driving circuit having a second thin film transistor having a same structure as the first thin film transistor; and

a wiring layer which is extended from the driver circuit and connected to the gate electrode of the first thin film transistor,

wherein an end of the semiconductor layer is provided so as not to protrude from an end of the gate insulating layer.

44. A device according to claim 43, further comprising an adhesion improving layer comprising one of a metal material and a metal oxide material for pretreatment before forming at least one of layers to be formed.

45. A device according to claim 43, further comprising a protective film over the semiconductor layer.

46. A device according to claim 43, wherein the conductive material of at least one of the gate electrode and the source and drain wirings contains one selected from the group consisting of Ag, Au, Cu, W, and Al as a main component.

47. A device according to claim 43, wherein the first and second thin film transistors can be operated at an electric field effect mobility of 1 cm^2/V-sec to 15

$cm^2/V \cdot sec$, and the semiconductor layer of each of the first and second thin film transistors contains hydrogen and halogen, and a semiconductor having a crystal structure.

48. A device according to claim 43, wherein the display device is a liquid crystal display device and the substrates sandwich liquid crystal.

49. A device according to claim 43, wherein the display device is mounted in one of a television receiver, a personal computer, a cellular phone, an information display, and an advertising board.

50. A display device comprising:

a first thin film transistor including:

a gate electrode comprising a conductive material over one of substrates;

an island shape gate insulating film including at least one of a silicon nitride layer, a silicon oxynitride layer, and a silicon oxide layer, which is in contact with the gate electrode;

a semiconductor layer;

source and drain wirings comprising a conductive material, which is connected to the semiconductor layer; and

one of a silicon nitride layer and a silicon oxynitride layer which is in contact with the source and drain wirings;

a pixel electrode connected to the first thin film transistor,

a driving circuit having a second thin film transistor having a same structure as the first thin film transistor; and

a wiring layer which is extended from the driver circuit and connected to the gate electrode of the first thin film transistor,

wherein an end of the semiconductor layer is provided so as to coincide with an end of the gate insulating layer.

51. A device according to claim 50, further comprising an adhesion improving layer comprising one of a metal material and a metal oxide material for pretreatment before forming at least one of layers to be formed.

52. A device according to claim 50, further comprising a protective film over the semiconductor layer.

53. A device according to claim 50, wherein the conductive material of at least one of the gate electrode and the source and drain wirings contains one selected from the group consisting of Ag, Au, Cu, W, and Al as a main component.

54. A device according to claim 50, wherein the first and second thin film transistors can be operated at an electric field effect mobility of 1 $cm^2/V \cdot sec$ to 15 $cm^2/V \cdot sec$, and the semiconductor layer of each of the first and second thin film transistors contains hydrogen and halogen, and a semiconductor having a crystal structure.

55. A device according to claim 50, wherein the display device is a liquid crystal display device and the substrates sandwich liquid crystal.

56. A device according to claim 50, wherein the display device is mounted in one of a television receiver, a personal computer, a cellular phone, an information display, and an advertising board.

57. A method for manufacturing a display device, comprising the steps of:

selectively forming a gate electrode by a droplet discharge method over a substrate which has one of an insulating surface and a base surface pretreated;

forming a gate insulating layer over the gate electrode,

forming a first semiconductor layer over the gate insulating layer,

selectively forming a channel protective layer by a droplet discharge method over an area which is overlapped with the gate electrode over the first semiconductor layer;

forming a second semiconductor layer containing an impurity having one conductivity type over the gate insulating layer, the first semiconductor layer, and the channel protective layer;

selectively forming a first mask layer over the second semiconductor layer;

etching the first semiconductor layer, the second semiconductor layer, and the gate insulating layer with the use of the first mask layer;

selectively forming a first insulating layer by a droplet discharge method over the gate electrode;

selectively forming source and drain wirings by a droplet discharge method;

etching the second insulating layer over the channel protective layer;

forming a passivation film over an entire surface of the substrate;

selectively forming a second insulating layer over the passivation film by a droplet discharge method;

etching the passivation film over the drain wiring; and

forming a transparent conductive film over the second insulating layer so as to connect to the drain wiring.

58. A method according to claim 57, wherein the steps of forming the gate insulating layer and forming the first semiconductor layer over the gate electrode is continuously performed without exposure to an atmosphere.

59. A method according to claim 57, wherein the steps of forming the gate insulating layer and forming the first semiconductor layer is continuously performed without exposure to an atmosphere.

60. A method according to claim 57, wherein the gate insulating layer is formed with a laminate in which a silicon nitride film, a silicon oxide film, and a silicon nitride

film are formed in order.

61. A method according to claim 57, wherein the second semiconductor layer, the first semiconductor layer, and the gate insulating layer are etched with the use of the first mask layer; thus, an end of the first semiconductor is provided so as not to protrude from an end of the gate insulating layer.

62. A method according to claim 57, wherein the display device is a liquid crystal display device.

63. A method for manufacturing a display device, comprising the steps of:

selectively forming a gate electrode by a droplet discharge method over a substrate which has one of an insulating surface and a base surface pretreated;

forming a gate insulating layer over the gate electrode,

forming a first semiconductor layer in layers over the gate insulating layer,

selectively forming a channel protective layer by a droplet discharge method over an area which is overlapped with the gate electrode over the semiconductor layer;

forming a second semiconductor layer containing an impurity having one conductivity type over the gate insulating layer, the first semiconductor layer, and the channel protective layer;

selectively forming a first mask layer over second semiconductor layer;

etching the first semiconductor layer, the second semiconductor layer, and the gate insulating film by using the first mask layer;

selectively forming a first insulating layer by a droplet discharge method over the gate electrode;

selectively forming source and drain wirings by a droplet discharge method;

etching the second insulating layer over the channel protective layer with the use of the source and drain wirings as masks;

forming a passivation film over an entire surface of the substrate;

selectively forming a second insulating layer by a droplet discharge method over

the passivation film;

etching the passivation film over the drain wiring with the use of the second insulating layer as masks; and

forming a transparent conductive film over the second insulating layer so as to connect to the drain wiring.

64. A method according to claim 63, wherein the steps of forming the gate insulating layer and forming the first semiconductor layer is continuously performed without exposure to an atmosphere.

65. A method according to claim 63, wherein the gate insulating layer is formed with a laminate in which a silicon nitride film, a silicon oxide film, and a silicon nitride film are formed in order.

66. A method according to claim 63, wherein the second semiconductor layer, the first semiconductor layer, and the gate insulating layer are etched with the use of the first mask layer; thus, an end of the first semiconductor is provided so as not to protrude from an end of the gate insulating layer.

67. A method according to claim 63, wherein the display device is a liquid crystal display device.